IN THE CLAIMS

1. (currently amended) A method of identifying a presence of a first fluid having a first transverse nuclear magnetic spin relaxation time T_2 in a mixture of earth formation fluids with a second fluid having a second transverse nuclear magnetic spin relaxation time T_2' greater than said first transverse relaxation time, the method comprising:

(a) producing a static magnetic field in said mixture ~~in~~ <u>of</u> said earth formation <u>fluids;</u>

(b) applying a pulse sequence having pulses

$A1 - \tau - B1 - \tau - A2 - TW - A3$

to said mixture where A1 is a first excitation pulse, τ is a Carr-Purcell time, B1 is a first refocusing pulse, A2 is forced inversion pulse, A3 is a second excitation pulse, and TW is a wait time wherein a resulting signal from said second fluid in said earth formation is substantially zero and

(c) determining said presence by analyzing signals after said second excitation pulse.

2. (original) The method of claim 1 wherein said first excitation pulse comprises a pulse having a tip angle substantially equal to 90°.

3. (original) The method of claim 1 wherein said second excitation pulse comprises a pulse having a tip angle substantially equal to 90°.

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4. (original) The method of claim 1 wherein said first refocusing pulse comprises a pulse having a tip angle substantially equal to 180°.

5. (previously presented) The method of claim 1 further comprising determining said value of TW by applying a sequence of refocusing pulses B_{2i} after said second excitation pulse and determining a value of TW for which substantially no spin echo signals are produced by said sequence of refocusing pulses.

6. (original) The method of claim 5 wherein at least one of said sequence of refocusing pulses comprises a pulse with a tip angle substantially equal to 180°.

7. (original) The method of claim 1 further selecting τ to satisfy the condition $T_2' >> \tau >> T_2$.

8. (original) The method of claim 5 further comprising:

(i) repeating (b) with different values of TW until no free induction decay signal after the second excitation pulse A3 is produced;

(ii) repeating (b) with a value of TW altered from the value determined in (i); and

(iii) analyzing a resulting free induction decay signal.

9. **canceled**

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10. (original) The method of claim 9 further comprising conveying said magnet on a logging tool into a borehole into said earth formation.

11. (original) The method of claim 10 wherein said logging tool is conveyed on a wireline.

12. (original) The method of claim 10 wherein said logging tool is conveyed on a drilling tubular.

13. (previously presented) A system for identifying a presence of first fluid having a first transverse nuclear spin relaxation time T_2 in a mixture of fluids in an earth formation with a second fluid having a second transverse spin relaxation time T_2' greater than said first transverse relaxation time, the system comprising:

(a) a logging tool conveyed into a borehole into said earth formation,

(b) a magnet on said logging tool which produces a static field in a region of said earth formation including said mixture;

(c) a transmitter on said logging tool which applies a radio frequency pulse sequence

A1 - τ- B1 -τ - A2 - TW - A3

to said mixture in said region, where A1 is a first excitation pulse, τ is a Carr-Purcell time, B1 is a first refocusing pulse, A2 is forced inversion pulse, and A3 is a second excitation pulse,

(d) a receiver on said logging tool which receives signals resulting from said nuclear spins resulting from application of said pulse sequence;

(e) a processor which:

(A) determines a value of TW for which a resulting signal from said second fluid is substantially zero, and

(B) identifies said presence of said first fluid by analyzing signals after said second excitation pulse.

14. (original) The system of claim 13 wherein said first excitation pulse comprises a pulse having a tip angle substantially equal to 90°.

15. (original) The system of claim 13 wherein said second excitation pulse comprises a pulse having a tip angle substantially equal to 90°

16. (previously presented) The system of claim 13 wherein said processor determines said value of TW by further applying a sequence of refocusing pulses B_{2i} after said second excitation pulse and determining a value of TW for which substantially no spin echo signals are produced by said sequence of refocusing pulse.

17. (previously presented) The system of claim 13 wherein said first refocusing pulse comprises a pulse having a tip angle substantially equal to 180°.

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18. (original) The system of claim 16 wherein at least one of said sequence of refocusing pulses comprises a pulse with a tip angle substantially equal to 180°.

19. (original) The system of claim 13 wherein $T_2' >> \tau >> T_2$.

20. (original) The system of claim 13 wherein said processor further performs:

(i) a repetition of (b) in claim 13 with different values of TW until no free induction decay signal after the second excitation pulse A3 is produced;

(ii) a repetition of (b) in claim 13 with the value of TW altered from the value determined in (i); and

(iii) analyzes a resulting free induction decay signal.

21. (original) The system of claim 13 further comprising a wireline for conveying said logging tool into said borehole.

22. (original) The system of claim 13 further comprising a drilling tubular for conveying said logging tool into said borehole.

23. (original) The system of claim 13 wherein said processor is on said logging tool.

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